CHAPTER 9
DEMAND FOR REMEDIATION OF CONTAMINATED WASTE SITES MANAGED BY STATES AND PRIVATE PARTIES

The market to remediate contaminated waste sites includes thousands of sites managed by the states and private parties. All non-federal agency sites that are not being cleaned up under the federal Comprehensive Environmental Response, Compensation, Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA) corrective action, and Underground Storage Tank (UST) programs, but still need attention, become the responsibility of state cleanup programs. Private parties are individuals or companies not affiliated with federal or state governments.

Using data supplied by the states, EPA has determined that over 79,000 non-National Priorities List (NPL) sites have been identified that are known or suspected to be contaminated. Further, 29,000 of these sites will require some action beyond a preliminary assessment; however, the actual number of sites that will need remediation and the extent of contamination at these sites are largely unknown.

The majority of states have enforcement authority and state Superfunds to finance remediation of abandoned waste sites. At the end of 1995, the balance of state Superfunds was $1.46 billion. During 1995, states spent a total of $386 million and obligated an additional $363 million from state Superfunds for remediation of NPL and non-NPL sites.

In addition to direct state cleanups, many state sites are cleaned up by private parties in accordance with state cleanup standards. To encourage private party cleanups, many states have created voluntary cleanup programs that often provide incentives for private parties to control the assessment and cleanup of their sites with state oversight. An increasing number of states also are creating brownfields programs that target the cleanup and redevelopment of industrial properties that have been abandoned or are under-used because of the potential for environmental contamination. By the end of 1995, 34 states had established voluntary cleanup programs and 15 states had established brownfields programs. Based on an EPA survey of states, EPA estimates that private party expenditures on assessment and remediation of contaminated sites are roughly equal to state expenditures.

9.1 State Hazardous Waste Site Programs

Most states have established hazardous waste programs to ensure that potentially contaminated sites are assessed and cleaned up if necessary. Information on state programs, numbers of contaminated sites, and the status of those sites has been derived from existing published information. Contacting individual states to obtain data was outside the scope of this study. The primary sources of information are two EPA documents, *An Analysis of State Superfund Programs: 50-State Study, 1993 Update*[1] and *An Analysis of State Superfund Programs: 50-State Study, 1995 Update*[2]. These two studies include the 50 states, Puerto Rico, and District of Columbia; for convenience, these are referred to as 52 "states." The studies describe each of the states' programs, including enabling legislation, enforcement provisions, staffing levels, funding, and other aspects of the programs. The legal and financial resources available to states indicate the extent of the states' commitment to cleaning up contaminated sites. Two additional sources of information were a document prepared jointly by EPA and the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), *A Report on State/Territory Non-NPL Hazardous Waste Site Cleanup Efforts for the Period 1980-1992*[3], and a report prepared by the Northeast-Midwest Institute with funding from the Economic Development Agency, U.S. Department of Commerce, *Coming Clean for Economic Development*.[4] Although the documents were developed primarily for policy purposes, the information provided is useful for defining the state market for hazardous waste remediation.

9.1.1 General Operations of State Cleanup Programs

Most of the states have enacted statutes patterned after CERCLA. These statutes typically include: provisions for emergency response and long-term remedial actions; cleanup funds or other mechanisms to finance remedial activities; enforcement authorities to compel responsible parties (RPs) to perform or pay for cleanup activities; and staff to administer state-lead cleanups and monitor RP-lead cleanups. As of December 1995, 45 states had authority to use funds for a full range of cleanup activities, five states had authority to use funds only for emergency responses or matching CERCLA expenditures, and two states had no fund or other account that could be used for cleanups (Nebraska and the District of Columbia). In addition, 47 states had enforcement authority provided through specific hazardous cleanup authority or a hazardous waste enforcement statute. Five other states derived their enforcement authority from statutes not specifically intended for hazardous waste activities, such as general environmental laws, and provisions within other state laws.

Many state statutes also authorize development of a priority list, inventory, or registry of state sites. Most states use their list to determine the order in which sites will be cleaned up. By the end of 1995, 30 states had statutory provisions requiring the use of a priority list, and 35 states reported that they had either state inventories or priority lists. The states use widely different criteria for placing sites on lists or within categories, and therefore, many lists are difficult to compare. Some state lists include all known and suspected sites, and others include only those sites that have completed a long evaluation process.

An important provision of some state statutes is that dealing with property transfers. These provisions are designed to ensure that real property being transferred between parties does not pose health or environmental threats stemming from hazardous releases. In general, these provisions require the owner or state to disclose that the property was contaminated by hazardous materials either by recording a notice with the deed or by disclosing such information at the time of the property transaction. Some of these laws require the seller of the property to remediate the site prior to any transfer of property. As of December 1995, 25 states had some type of property transfer provision in their laws or regulations.

The resource levels a state has committed provides a useful indicator of the level of activity in a state cleanup program. In 1995, the total number of state personnel working in state cleanup programs was 3,585. An additional 211 attorneys were reported by the states to be working on waste cleanup issues. Staff levels for state programs varied from three people in South Dakota to 650 staff positions in New Jersey. Eleven states had staffing levels exceeding 100 in 1995. Each of these states (California, Illinois, Kansas, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Texas, and Washington) had a large number of confirmed or suspected contaminated sites. Six states (Connecticut, Florida, Indiana, Minnesota, Oregon, and Tennessee) had staff levels between 51 and 100 people. The majority of states (31) had staff levels between 11 and 50, while only four states had 10 or fewer staff positions for their hazardous waste programs.

9.1.2 Voluntary and Brownfields Programs

The states increasingly are adopting new programs to encourage private parties to voluntarily clean up sites rather than expending state resources or fund monies on enforcement actions or site cleanups. By the end of 1995, 34 states have established voluntary cleanup programs through statute, regulation, or policy.[2] Fifteen states have established "brownfields" programs that provide incentives for the cleanup and redevelopment of industrial sites that have been abandoned or are under-used because of fear of liability associated with potential environmental contamination. Exhibit 9-1 shows those states that have voluntary cleanup and brownfields programs.

The voluntary cleanup and brownfields programs incorporate efforts by the states to reduce factors that tend to discourage voluntary cleanup, such as liability for cleanups, lack of control over remediation, and cost.[2] Although the programs vary considerably, most voluntary cleanup programs include clear cleanup standards, timely

cleanup oversight, cleanup closure procedures, and liability protection. Most states offer some form of protection from future liability to private parties when the site is voluntarily cleaned up to state standards. Liability protection is provided through covenants not to sue, no further action letters, certificates of completion, and other mechanisms. State brownfields programs typically extend liability protection to prospective purchasers, lenders, and real estate developers. Liability protection is contingent upon no further contamination being found or created at the site and does not always protect private parties from federal liability requirements.

Exhibit 9-1: State Voluntary Cleanup and Brownfields Programs

States	Voluntary Cleanup Program	Brownfields Program	States	Voluntary Cleanup Program	Brownfields Program
Alabama	yes	—	Montana	yes	—
Alaska	—	—	Nebraska	yes	—
Arizona	yes	—	Nevada	yes	—
Arkansas	yes	yes	New Hampshire	yes	—
California	yes	—	New Jersey	yes	yes
Colorado	yes	—	New Mexico	—	—
Connecticut	yes	yes	New York	yes	—
Delaware	yes	yes	North Carolina	yes	—
District of Columbia	—	—	North Dakota	—	—
Florida	—	—	Ohio	yes	yes
Georgia	—	—	Oklahoma	yes	—
Hawaii	—	—	Oregon	yes	yes
Idaho	—	—	Pennsylvania	yes	yes
Illinois	yes	yes	Puerto Rico	—	—
Indiana	yes	yes	Rhode Island	yes	yes
Iowa	—	—	South Carolina	yes	—
Kansas	—	—	South Dakota	—	—
Kentucky	—	—	Tennessee	yes	—
Louisiana	yes	—	Texas	yes	—
Maine	yes	—	Utah	yes	—
Maryland	—	—	Vermont	—	yes
Massachusetts	yes	yes	Virginia	yes	—
Michigan	yes	yes	Washington	yes	—
Minnesota	yes	yes	West Virginia	—	—
Mississippi	—	—	Wisconsin	yes	—
Missouri	yes	yes	Wyoming	—	—
			Total	34	15

Source: U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1995 Update*, July 1996.

9.1.3 Federal Initiatives Affecting State Cleanup

The federal government has actively encouraged and assisted states in their efforts to clean up their contaminated properties. For example, EPA has a program dedicated to help states address brownfields sites, which potentially can affect a large number of sites. EPA defines brownfields as "abandoned, idle, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination." The U.S. General Accounting Office (GAO) estimated that there are between 130,000 and 450,000 brownfields sites that will cost over $650 billion to clean up.[5]

Where past use of a site raises the possibility that the site may be contaminated, fear of being caught in the Superfund liability net often stymies further development at the site. Lenders, developers, and prospective purchasers are discouraged from getting involved with a site, because of the risk of having to pay cleanup costs.

Current brownfields owners often are not willing to conduct an assessment of their sites for fear of finding contamination that may have been a result of their activities or those of past owners. Many brownfields end up as the property of local governments through foreclosure. Most brownfields are located in urban areas and are generally associated with unaddressed contamination, declining property values, increased unemployment, and movement of industries to the suburbs.

In January 1995, EPA announced the Brownfields Action Agenda that outlined EPA's activities and future plans to help states and localities clean up and reuse brownfields. EPA committed to the following four broad areas:

- EPA would fund at least 50 Brownfields Demonstration Pilots for up to $200,000 over two years so that states and municipalities can develop and test redevelopment models.

- EPA would work with states and municipalities to clarify agency guidance regarding the liability of prospective purchasers, lenders, property owners, and others associated with activities at potentially contaminated sites.

- EPA would work with states, municipalities, and community representatives to promote public participation and community involvement in brownfields redevelopment decision-making.

- EPA would establish partnerships with community colleges to develop strategies for allowing local residents an opportunity to qualify for jobs created as a result of brownfields activities.

By the end of FY 1996, Brownfields Pilots have been awarded to the 76 cities and states listed in Exhibit 9-2. EPA plans to fund additional pilots in FY 1997.

Another federal initiative, which is being implemented by the U.S. Department of Housing and Urban Development (HUD), is an Empowerment Zone (EZ) and Enterprise Community (EC) initiative designed to empower communities across the nation to work together to create jobs and opportunity. A key element of the EZ and EC programs is the development of community-based strategies for the cleanup and environmentally friendly reuse of brownfields, which have been identified as one of the major impediments to the creation of jobs and opportunity. The cities receiving these designations will receive flexible social services block grants of up to $100 million for EZs. In addition, tax incentives will be provided for businesses that are located in EZs and ECs. A primary goal of HUD's initiative is to increase cooperation among federal, state, and local governments to encourage more effective economic, human, environmental, and community development strategies. In selected cities, EPA will help to identify sites in need of environmental remediation.

9.2 Factors Affecting Demand for Cleanups

The state market for remediation services is largely dependent upon the commitment of states to establish and manage hazardous waste programs and the ability of states to finance cleanups or compel RPs to clean up sites. Enforcement authorities provided under state laws vary significantly among the states. As of

December 1995, 47 states had enforcement provisions contained in cleanup fund laws. Other states rely on their general environmental laws, groundwater laws, and other provisions for enforcement. For example, Nebraska relies on its groundwater protection laws, which apply only to contamination of groundwater. Virtually all state programs have authority to issue administrative cleanup orders and all states have authority to seek injunctions for cleanups. Recovery of punitive damages is provided in 25 states, and most states also have criminal and civil penalty provisions that may be used to enforce hazardous site cleanups. However, these provisions have not proven to be as effective in encouraging private-party cleanup actions as have some other incentive methods. The authority to perform fund-lead cleanups and recover punitive damages is the strongest incentive for securing private party cleanups. The potency of this incentive depends upon the resolve of a state to spend fund monies. Increases and decreases in state cleanup funds will affect the number and complexity of remedial actions undertaken by the states. State Superfunds may be impacted by economic and political conditions that influence state revenues. Except for the largest state programs, many states will have to rely on their ability to either compel private parties or encourage voluntary actions to clean up contaminated state sites.

Exhibit 9-2: Cities and States Awarded Brownfield Pilot Programs

- Birmingham, Alabama
- Prichard, Alabama
- Emeryville, California
- Oakland, California
- Richmond, California
- Sacramento, California
- San Francisco, California
- Stockton, California
- Sand Creek Corridor, Colorado
- Bridgeport, Connecticut
- Naugatuch Valley, Connecticut
- New Haven, Connecticut
- Clearwater, Florida
- Miami, Florida
- Atlanta, Georgia
- Panhandle Health District, Idaho
- East St. Louis, Illinois
- State of Illinois
- West Central Municipal Conference, Illinois
- Indianapolis, Indiana
- Northwest Indiana Cities, Indiana
- State of Indiana
- Louisville, Kentucky
- New Orleans, Louisiana
- Shreveport, Louisiana
- Portland, Maine
- Baltimore, Maryland
- Boston, Massachusetts
- Chicopee, Massachusetts
- Lawrence, Massachusetts
- Lowell, Massachusetts
- Somerville, Massachusetts
- Worcester, Massachusetts
- Chippewa County-Kinross Township, Michigan
- Detroit, Michigan
- Downriver Community Conference, Michigan
- Kalamazoo, Michigan
- State of Minnesota
- Bonne Terre, Missouri
- Kansas City, Kansas and Missouri
- St. Louis, Missouri
- Navajo Nation
- Concord, New Hampshire
- Camden, New Jersey
- Newark, New Jersey
- Trenton, New Jersey
- Buffalo, New York
- New York, New York
- Rochester, New York
- Rome, New York
- Charlotte, North Carolina
- Cincinnati, Ohio
- Cleveland, Ohio
- Lima, Ohio
- Oregon Mill Sites, Oregon
- Portland, Oregon
- Philadelphia, Pennsylvania
- Phoenixville, Pennsylvania
- Pittsburgh, Pennsylvania
- State of Rhode Island
- Sioux Falls, South Dakota
- Knoxville, Tennessee
- Dallas, Texas
- Houston, Texas
- Laredo, Texas
- Murray City, Utah
- Provo, Utah
- Salt Lake City, Utah
- West Jordon, Utah
- Burlington, Vermont
- Cape Charles-North Hampton County, Virginia
- Richmond, Virginia
- Bellingham, Washington
- Duwamish Coalition, Washington
- Puyallup Tribe, Tacoma Washington
- Tacoma, Washington

Source: U.S. EPA, Office of Solid Waste and Emergency Response, December 1996.

9.3 Number of Sites

The two 50-State Studies present the results of a survey in which each state was asked to identify the total number of "Known and Suspected Sites" and "Sites Needing Attention." The number of "Known and Suspected Sites" generally is the largest number of potentially contaminated sites known to the state and includes sites that have not yet undergone any type of assessment. The "Sites Needing Attention" are known and suspected sites that have been evaluated by the state and determined to require some further level of assessment or action. The studies do not present estimates of the number of sites that definitely require remedial action. Exhibit 9-3 presents each state's estimate for both categories of sites.

The total number of known and suspected sites reported in 1995 was 79,387 (up from 69,808 in 1991 but down from 101,796 in 1993). The largest decreases in known and suspected sites from 1993 to 1995 were in California, which decreased by 16,000; Michigan, which decreased by 9,700; and Pennsylvania, which decreased by 2,900. The decrease of sites reported by California was due to a reclassification of sites and better assessments of sites that will require action. The decrease of sites reported by Michigan was due to the elimination of underground storage tank sites from their estimate.

Exhibit 9-3: Number of Non-NPL State Hazardous Waste Sites

States	Known & Suspected Sites[a]		Sites Needing Attention[b]	
	1993	1995	1993	1995
Alabama	625	650	125	125
Alaska	1,051	1,347	1,051	1,347
Arizona	450	1,620	65	400
Arkansas	351	398	101	45
California	26,000	9,809	350	1,079
Colorado	420[c]	225	—	225
Connecticut	1,475	2,440	579	649
Delaware	288	280	89	120
District of Columbia	0	30	0	0
Florida	1,015	1,023	725	656
Georgia	800	904	0[c]	82
Hawaii	2,500	200	—	25
Idaho	220	59	50	59
Illinois	1,400	5,000	147	950
Indiana	1,549	2,500	82	200
Iowa	900	900	200	200
Kansas	450	609	200	324
Kentucky	1,000	1,000	500	600
Louisiana	1,014	690	184	136
Maine	370	419	160	92
Maryland	463	463	343	198
Massachusetts	6,328	7,500	5,867	4,500
Michigan	9,785	—	9,785	2,764
Minnesota	542	3,600	184	215
Mississippi	390	770	200	156
Missouri	1,253	1,475	163	200

Exhibit 9-3: Number of Non-NPL State Hazardous Waste Sites (continued)

States	Known & Suspected Sites[a]		Sites Needing Attention[b]	
	1993	1995	1993	1995
Montana	265	277	265	240
Nebraska	370	400	120	200
Nevada	145	136	145	136
New Hampshire	250	250	250	250
New Jersey	18,519	20,000	12,894	6,500
New Mexico	600	278	220	182
New York	995	929	680	793
North Carolina	665	1,029	655	801
North Dakota	72[c]	0	0[c]	0
Ohio	1,200	1,190	771	406
Oklahoma	—	767	—	162
Oregon	1,235	1,559	102	218
Pennsylvania	3,000	100	50	50
Puerto Rico	246[c]	256	246[c]	256
Rhode Island	300	300	60	40
South Carolina	475	550	200	120
South Dakota	218	1,065	218	241
Tennessee	1,142	1,270	157	198
Texas	1,200	821	83	66
Utah	200	220	31	—
Vermont	1,291	1,700	1,291	931
Virginia	3,100	2,015	310	363
Washington	1,029	1,364	628	932
West Virginia	500	—	—	—
Wisconsin	4,000	4,000	565	565
Wyoming	140[c]	—	—	—
Totals	**101,796**	**79,387**	**41,091**	**28,997**

Notes:

[a] "Known and Suspected" sites are those that states have identified as being potentially contaminated. Many of these sites will not require action beyond a preliminary assessment. Site numbers are derived from Table V-5 of the 1993 *50-State Study* and Table V-3 of the 1995 *50-State Study* unless otherwise noted. The totals include an unknown, but small, percentage of UST and RCRA sites.

[b] "Sites Needing Attention" are those "Known and Suspected" sites that have been assessed and determined to require further assessment or cleanup. Many of these sites will require removal or remedial actions. Site numbers are derived from Table V-5 of the 1993 *50-State Study* and Table V-3 of the 1995 *50-State Study* unless otherwise noted. The totals include an unknown, but small, percentage of UST and RCRA sites.

[c] Because a number was not provided in Table V-5 of the 1993 *50-State Study*, information on non-NPL sites listed in EPA's CERCLA Information System (CERCLIS) provided in Chapter VI, "State Summaries" was used.

— Indicates that data were not provided.

Sources: U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1993 Update*, EPA/540/R-94/008, December 1993.
U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1995 Update*, EPA-540-R-96-036, July 1996.

The total number of sites determined to need further attention in 1995 was 28,997 (up from 19,266 in 1991 but down from 41,091 in 1993). The largest decreases in sites reported as needing further attention from 1993 to 1995 were in Michigan, which decreased by 7,000 sites; and New Jersey, which decreased by 6,000 sites. The total number of sites determined to need further attention includes an unknown—but small—percentage of RCRA and UST sites, which are addressed in Chapters 4 and 5 of this report. During collection of data from the states, authors of the *50-State Study* requested that the states exclude RCRA and UST sites from their reports, if they could. However, some states were unable to separate the RCRA and UST site data from other hazardous waste sites.

A central source of information that characterizes the types and quantities of contaminants found at state sites is not available. However, some states with established, well-funded programs are able to produce this type of information. For example, the California Department of Toxic Substances Control, within the state's Environmental Protection Agency, publishes a biennial report[6] that describes the Department's site mitigation and other environmental protection programs. The report includes a list of currently active sites, a list of certified remediated and delisted sites, and data on emergency response activities by county. The Department also maintains a database, called *CalSites*, that contains information on almost 10,000 potential and known sites. The Department provides access to *CalSites* through its headquarters and regional offices. Appendix E provides contacts for state environmental offices.

The types of contaminants present at some state sites can be inferred from sites listed in EPA's CERCLA Information System (CERCLIS), EPA's database of potentially contaminated sites. EPA has performed preliminary assessments at these sites to screen them for the federal NPL. The majority of these sites (those not listed on the NPL) are deferred to the states for action. CERCLIS data show that the most prevalent wastes at these sites are organic chemicals, metals, solvents, and oily waste.[7]

9.4 Estimated Cleanup Costs

This section describes the status of state cleanup funds and provides an estimate of recent annual expenditures and the total cost to complete the cleanup of all known state sites.

9.4.1 Status and Capacity of State Cleanup Funds

A fund is an essential element of a state's program to clean up sites. It allows a state to investigate, plan, design, and conduct emergency response and remedial actions at sites where immediate action is required or where RPs are unavailable, unable, or unwilling to conduct or pay for remedial actions. Fifty "states" have established cleanup funds or provided a mechanism for the state agency to pay for one or more types of cleanup activities at non-NPL sites. Nebraska and the District of Columbia are the only "states" without authorized cleanup funds.

The combination of fund balances, additions to funds, and expenditures can indicate the capability and stability of a state cleanup program. Exhibit 9-4 compares the fund balances, additions to funds, and expenditures of the states in 1991, 1993, and 1995.

Most of the state fund balances (including bonding authority) are concentrated in a relatively few states. In 1995, seven states (Alaska, California, Indiana, Michigan, New Jersey, New York, and Pennsylvania) accounted for $1.18 billion (80.8 percent) of the total fund balances for all states.

The annual contributions to state funds fluctuated sharply from 1991 to 1995. The states added $382 million to their cleanup funds during 1991, $957 million in 1993, and $445 million in 1995. As with fund balances, the amounts added to funds are concentrated in a relatively few states. Five states (Michigan, New Jersey, New York, Pennsylvania, and Washington) added $275.8 million (62 percent) of the total added to state funds in 1995.

Exhibit 9-4: Comparison of State Funds, Expenditures, and Sites 1991, 1993, and 1995 ($millions)

	1991	1993	1995
Total Fund Balances*	$2,218.5	$1,523.4	$1,464.9
Additions to Funds	$381.6	$957.3	$444.6
Expenditures/Obligations	$427.8	$1,170.9	$749.6
Number of Known and Suspected Sites	69,808	101,796	79,387
Number of Sites Needing Attention	19,266	41,091	28,997

* Fund balances include both money in the fund and authority to sell bonds to raise additional monies. The fund balances included the following amounts in the fund: $603.7 in 1991, $556.2 in 1993, and $609.0 in 1995. The rest of the fund balances were in bond authority.

Exhibit 9-5 presents the Superfund balances for each state as of December 1993 and 1995 and provides the total expenditures and obligations of funds by each state for hazardous waste activities in 1993 and 1995. The state fund balances totaled $1.46 billion in 1995, including bond authorizations (authority by state law to issue bonds and spend the proceeds on cleanups).

The states' experience with past cleanups indicates that the cost of a remedial action at a single site is likely to exceed $1 million.[2] While all but two states have some public funding capability, fund balances in some states are quite small or limited to emergency response or removal actions. At the end of 1995, eight of the 52 "states" did not have fund balances large enough to clean up at least one average-cost site (about $1 million) with fund monies (Alabama, District of Columbia, Kansas, Maryland, Nebraska, North Dakota, Rhode Island, and Wyoming). Another 14 states had balances between $1 million and $3 million. The remaining 30 of the 52 "states" had fund balances over $3 million. Although a state's fund balance indicates its ability to pay for a cleanup at any given time, this indication is only an approximation of cleanup activity in a state in a given year. The level of cleanup activity also depends on the rate that funds flow into and out of the fund, which differs from one state to another. Thus a state that rapidly replenishes its funds, for example by recovering cleanup costs from RPs, would have a high level of cleanup activity relative to the balance of the fund at any given time.

9.4.2 Annual and Projected Cleanup Costs

The estimate of the cost of cleanup for state and private party cleanups is based on the following assumptions:

- Non-NPL expenditures will average $203 million annually. This figure is the total 1995 non-NPL expenditures for 37 states that reported this item separately in the 1995 *50 State Study*.[2] This amount may be an underestimate of total national non-NPL expenditures, because it does not include 13 states for which data are not available. On the other hand these costs include some administrative and site investigation costs.

- Responsible party expenditures are estimated to be equal to state expenditures, based on the ASTSWMO study.[3] Based on cost data submitted for 3,395 CERCLIS sites during the period 1980-1992, RPs paid $555 million and the states paid $650 million to clean up these sites. Therefore, RP expenditures appear to be roughly equal to state expenditures at state sites. No centralized source of data is available that includes private party expenditures for cleanups through the states' voluntary cleanup or brownfields programs.

Exhibit 9-5: State Hazardous Waste Funds: 1993 and 1995 Expenditure/Obligations and Balances

States	Expenditures & Obligations[a]		Fund Balances[b]	
	1993	1995	1993	1995
Alabama	$80,230	$324,048	$379,690	$478,167
Alaska	$900,000	$16,500,000	$0	$73,356,000
Arizona	$7,272,900	$2,660,000	$3,743,000	$1,280,000
Arkansas	$1,459,951	$1,080,288	$6,202,997	$7,450,050
California	$88,600,000	$14,399,000	$26,908,000	$59,400,000
Colorado	$10,200,000	$12,800,000	$13,200,000	$16,200,000
Connecticut	$5,750,000	$18,000,000	$21,775,000	$10,575,000
Delaware	$4,890,000	$2,000,000	$4,000,000	$3,700,000
District of Columbia	$0	$0	$0	$0
Florida	—	$6,982,000	$8,363,000	$7,000,000
Georgia	$0	$7,438,889	$8,260,818	$13,029,281
Hawaii	$32,456	$1,700,000	$222,604	$3,000,000
Idaho	$1,009,625	$6,807	$3,139,032	$4,375,877
Illinois	$16,701,300	$4,474,000	$6,065,300	$6,400,000
Indiana	$11,691,535	$2,743,151	$14,907,856	$50,512,589
Iowa	$124,323	$40,000	$1,006,218	$1,300,000
Kansas	$1,864,000	$4,230,000	$1,868,000	$225,000
Kentucky	$1,785,000	$4,000,000	$5,000,000	$1,770,000
Louisiana	$2,867,909	$2,431,850	$3,056,023	$2,007,883
Maine	$11,703,000	$1,717,030	$5,700,000	$10,573,050
Maryland	—	—	$14,000,000	—
Massachusetts	$18,200,000	$20,027,186	$23,600,000	$2,513,036
Michigan	$60,456,000	$50,500,000	$18,200,000	$184,000,000
Minnesota	$8,451,000	$7,122,002	$5,252,000	$2,981,000
Mississippi	$440,000	$2,505,000	$2,700,000	$1,325,000
Missouri	$2,000,000	$2,800,000	$5,800,000	$5,300,000
Montana	$1,504,727	$2,780,258	$3,002,329	$1,451,893
Nebraska	$0	$0	$0	$0
Nevada	$250,000	$500,000	$6,000,000	$1,000,000
New Hampshire	$1,603,000	—	$3,000,000	$3,000,000
New Jersey	$313,100,000	$100,100,000	$161,500,000	$136,700,000
New Mexico	$350,841	$522,840	$103,634	$1,204,500
New York	$183,600,000	$252,900,000	$905,400,000	$599,100,000
North Carolina	$0	$4,784,196	$3,783,852	$7,800,000
North Dakota	$0	$0	$79,000	$129,000
Ohio	$21,723,044	$16,945,817	$34,680,714	$39,560,693
Oklahoma	$28,000	$696,230	$260,000	$2,096,005
Oregon	$18,746,169	$8,781,016	$5,476,340	$5,974,000
Pennsylvania	$34,401,000	$39,000,000	$60,500,000	$75,000,000

Exhibit 9-5: State Hazardous Waste Funds: 1993 and 1995 Expenditure/Obligations and Balances (continued)

States	Expenditures & Obligations[a] 1993	Expenditures & Obligations[a] 1995	Fund Balances[b] 1993	Fund Balances[b] 1995
Puerto Rico	$555,000	$986,717	$4,185,000	$2,482,111
Rhode Island	—	$2,377,000	$2,000,000	$2,655
South Carolina	$8,100,000	$1,504,045	$16,900,000	$18,635,064
South Dakota	$0	$61,885	$1,715,767	$1,750,000
Tennessee	$2,471,323	$3,154,805	$6,260,883	$8,036,052
Texas	$262,139,832	$28,615,006	$30,396,128	$47,361,124
Utah	$1,075,000	$5,288,000	$425,000	$5,100,000
Vermont	$3,387,596	$5,700,000	$1,544,426	$4,240,000
Virginia	$67,865	$73,926	$311,338	$2,575,861
Washington	$51,993,254	$72,960,209	$46,302,976	$28,536,973
West Virginia	$1,074,476	—	$2,200,000	$1,000,000
Wisconsin	$8,287,306	$15,350,000	$24,032,917	$3,472,400
Wyoming	—	—	$0	—
Totals	**$1,170,937,662**	**$749,563,201**	**$1,523,409,842**	**$1,464,960,264**

Notes:
[a] Includes funds expended and obligated by the states in 1993 and 1995 for NPL and non-NPL site cleanups.
[b] Includes unobligated funds and bonding authority for $967,200,000 available in four states (Massachusetts, Michigan, New York, and Wisconsin) for 1993 and unobligated funds and bonding authority in five states (California, Maine, Michigan, New York, and New Jersey) for 1995.
— Indicates that data were not provided.

Sources: U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1993 Update*, EPA/540/R-94/008, December 1993.
U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1995 Update*, EPA-540-R-96-036, July 1996.

- EPA assumes that it will take an average of 30 years for states to complete the cleanup of known sites (some states may take as many as 50 years, but 30 years is an approximate average of all states).

Thus, the total costs for both state and RPs is estimated to be $12.2 billion ($203 million X 2 X 30 years). As noted above, this amount does not include 13 states for which data are not available. On the other hand these costs include some administrative and site investigation costs. The states' annual expenditures and obligations for cleanup activities have fluctuated sharply from 1991 to 1995. The states expended or obligated a total of $428 million for cleanup activities in 1991, $1.17 billion in 1993, and $750 million in 1995. The four states that expended or obligated the most money in 1995 were Michigan, New Jersey, New York, and Washington, which accounted for $476.4 million (64 percent) of the total amount of money expended or obligated in 1995. Because the above expenditures and obligations data often combine expenditures and obligations on the one hand, and NPL and non-NPL site costs on the other, it is difficult to detail the trends in total non-NPL state and private party expenditures.

The states expended their funds for nine basic activities: emergency response, removals, site investigation, study and design, remedial actions, operation and maintenance, matching CERCLA funds to pay the state share for NPL sites, grants to cities and local governments, and victim compensation. The distribution of funds among these activities is unknown.

The states used RPs as the major funding source for site cleanups at 35,000 CERCLIS sites.[3] At these sites, RPs cleaned up 31 percent of the sites through enforcement actions and 55 percent through voluntary or property transfer actions.

9.5 Remedial Technologies

Based on state actions from 1980 to 1992 at 35,166 sites that had been listed on the CERCLIS database, the states selected the following as the predominant remedies: 1) containment, either on-site or off-site, at 76 percent of the sites; 2) treatment, either on-site or off-site, at 17 percent of the sites; 3) site security (*e.g.*, fences and warning signs) at 5 percent of the sites; 4) population protection at 2 percent of the sites; and 5) innovative technologies at less than one percent of the sites. This information is not broken out by year, so changes in technology use over time cannot be determined.[3] These data are somewhat dated, however, and the use of technology may have changed over the past five years, especially in light of the rapid development and acceptance of *in situ* technologies. The use of innovative technologies for underground storage tank sites, discussed in Section 5.6, has been growing rapidly, and this may be an indicator of current remedial approaches for state sites.

9.6 References

1. U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1993 Update*, EPA/540/R-94/008, December 1993.

2. U.S. EPA, Office of Emergency and Remedial Response, *An Analysis of State Superfund Programs: 50-State Study, 1995 Update*, EPA-540-R-96-036, PB96-963249, July 1996.

3. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, and Association of State and Territorial Solid Waste Management Officials, *A Report on State/Territory Non-NPL Hazardous Waste Site Cleanup Efforts for the Period 1980-1992*, OSWER Pub. 9242.2-09, EPA/540/R-94/001, July 1994.

4. U.S. Environmental Protection Agency and Northeast-Midwest Institute, *Coming Clean for Economic Development*, December 1995.

5. U.S. General Accounting Office, *Community Development: Reuse of Urban Industrial Sites*, GAO Report #RCED-95-172, June 1995.

6. California Environmental Protection Agency, Department of Toxic Substances Control, *Biennial Report*, Sacramento, California, 1993-1994.

7. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *Superfund CERCLIS Characterization Project: National Results*, EPA/540/8-91/080, November 1991.